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ABSTRACT

The Houston (Texas) Independent School District established a Department of Technology to encourage the use of educational technology, especially computers, in district schools. Obstacles included claims to "turf," rapid technological change, and the lack of trained management, clear policies, and sufficient staff incentives. The department established short and long-range program goals, helped create district policy, and identified training as critical for success. The department planned to use technology to teach technology, train a cadre of teachers at each campus, use teachers as "facilitators," base training certification on proficiency, emphasize computer applications rather than programming, standardize hardware, establish a model classroom, create districtwide data processing formats, and stress problem-solving. The plan focused on training educational personnel in the uses of technology from the top administrators and school board members down to ensure administrative support. Rules identified who was to be trained and to what degree. The department also provided networking, a software library, software and curriculum review, a newsletter, a mentor system, an annual technology fair, stipends for trainees, and support for parent involvement, as well as methods for maximizing funding. Local school initiatives enhancing the district program were encouraged. (PGD)

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Planning for the Effective Use Of Educational Technology

by

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There's an old Chinese proverb that says, "If you want to plan for the year, plant a seed. If you want to plan for ten years, plant a tree. But, if you want to plan for 100 years, **educate the people.**" No one would argue with the premise that education is the plaster that holds a society together. Our schools are a reflection of a society that is becoming increasingly aware of technology's profound impact. Are the schools gearing up for the changes ahead?

After over 40 reports dealing with the need for educational reform in the United States, most practitioners are struck by the fact that so many critics want to return the schools to the standards and practices employed in the 1950's. When one looks at the current financial constraints facing the schools, the inadequacy of staff compensation, and the tremendous shortage of classroom teachers, it becomes obvious that technology must be exploited to the maximum. High expectations have been established for using technology to enhance the instructional program, improve productivity, reduce paperwork, and contain costs.

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Implementation Obstacles

For at least ten years, there has been a lot of enthusiasm about the "potentials" of technology. It is generally acknowledged that computers have not penetrated the mainline curriculum for a variety of reasons, including hardware incompatibility, inadequate software, and poor teacher training. But, how many times do administrators and curriculum specialists deal with the more fundamental issues which underlie the most serious implementation obstacles?

- **Turf**--Most school districts are still encountering considerable confusion about staff roles and responsibilities involved in technology coordination. Houston has found that all microcomputer applications should be coordinated by one department, if possible, to minimize turf battles. One reason for this is that the line between school administration and instruction is blurring, thanks to accountability demands. A district can increase its leverage with vendors if they must deal with the same staff members consistently.

- **Adequate Management Support**--Implementing computers requires a lot of administrative training, special maintenance, curriculum adaptation, and scheduling adjustments. What kind of training do board members, central officers, and principals need in order to provide adequate guidance? In what fundamental ways will schools and curricula change as a result of technology, and how do decision-makers reach consensus in planning for those changes?

Houston has found that it is wise not to "bite off more than you can chew." Plunging headfirst into implementation without time for staff training is a big mistake. It is wise to begin communication and training at the top of the administrative pyramid. This will help de-bug programs before they reach students.

- **Long-Range Planning**--Technology is changing so rapidly that many school leaders are troubled by how all of the new and existing pieces will fit together. New models are being introduced which rapidly supersede their predecessors. With the interactive videodisc, integrated networks, and compact disc ROMS around the corner, what kind of policies should a district put in place for hardware and software acquisition and use? How can obsolescence be accommodated? What kinds of changes in school facilities will be required for the types of telecommunications networks that will likely be in place?

  In Houston's experience, long-range technology planning is a tricky business. Those responsible for implementation must read the key education and technology journals and not be afraid to hire consultants when appropriate. Be cautious about buying hardware that cannot be supported. If a piece of hardware does not perform to expectations, the best solution may be to move it to another location and redefine the application.

- **Policy Development**--In implementing technology, many new issues appear as schools try to deal with a computer technology that is changing very rapidly. The process is exacerbated by the slow rate of change in education. What policies are needed to address issues such as software evaluation, access/equity, home/school coordination, and curriculum integration?

  The field of educational technology is murky enough without administrators being confused by a lack of district policy. One of the first steps Houston's Department of Technology took after being formed was to get school board approval of a set of policies which are still in effect today. In writing policies, clearly communicate rationales and implications. It may be difficult to tell top school officials that they cannot buy a particular brand of micro, for example, but if you can refer them to the policies, and explain why hardware and software standardization benefit everyone, they will cooperate.

- **Staff Incentives**--If new technology is to be fully implemented, the technical skills of the entire staff, from school secretary to superintendent, need to be upgraded. Even if knowledgeable trainers can be found, where does one find the time for training, and what incentives are needed to motivate staff to acquire these proficiencies?

  Technology training is admittedly expensive, but if a district cannot afford a full-blown training staff, there are alternatives--free or reduced-price hardware, access to software, and volunteer help, to

name a few. Most dedicated teachers will jump through hoops if they are recognized for their efforts. Houston publishes a technology newsletter, for example, which not only informs readers of new programs, but recognizes those who have "gone the extra mile" to serve students.

Houston's Department of Technology

In order to sidestep these kinds of implementation obstacles, the Houston Independent School District four years ago established a centralized Department of Technology. This department assumed responsibility for:

- Evaluation and purchase of hardware and software
- Support of a district-wide cable television network with production facilities
- Strategic planning
- Software development (instructional and administrative)
- Telecommunications and maintenance
- Technology integration (program planning, technical training, and curriculum integration)
- Administrative services
- Special projects

In the first six months of planning, short (one-year) and long-range (three-year) plans were developed to identify how technology could help address instructional and administrative needs. Without exception, training was the essential ingredient that supported each district goal. With 9,000 teachers in the district, it was obvious that it was not realistic to train every teacher, especially

since the three-year goal was to establish computer resource centers in each school rather than place computers in individual teacher's rooms.

Training Assumptions

In building a central staff and designing a support structure, the training program became the foundation for the district's strategic plan. In designing this training program, Houston made philosophical commitments to:

- **Use technology to teach technology**--A variety of media, including computers, is used to convey information. To train large numbers of Chapter I coordinators in the implementation of a microcomputer project, for example, Houston developed an instructional videotape which has saved thousands of hours of training time. To teach beginners how to use its district-developed word processor, D.O.T.Writer, Houston produced a "D.O.T.Writer Tutorial." Many disk-based tutorials exist now to teach use of specific application programs.

- **Train a cadre of expert teachers at each campus**--240 teacher technologists have received 296 hours of instruction. These teachers then help train others in their buildings.

- **Model the teacher as a "facilitator" of instruction rather than as a "lecturer"**--Model training sessions and materials are provided that can be replicated by technologists.

- **Develop a competency-based program where advanced training hinges on demonstrated proficiency**--Certificates are issued to staff for professional-growth credit.

- **Emphasize the *applications* of the computer and deemphasize programming proficiency**--Application tools promote problem solving and information management skills which are important for all students.

- **Standardize hardware**--For example, Houston uses Apples for instruction; IBM's and Macintoshes for various administrative applications.

- **Establish a model classroom of the future**--Teachers get the chance to practice operations they have learned in a simulated classroom at the Department of Technology.

- **Establish consistent data formats for word processing and data management to promote district-wide communication**--HISD developed its own programs, D.O.T.Writer and D.O.T.Filer, toward this end.

- **Emphasize a problem-solving model for instruction**--This paradigm is emphasized in all staff training, software evaluation, and curriculum development.

There is a radical premise underlying these philosophical commitments. Teachers in Houston are learning how to manage a very different type of classroom

environment. Students are not doing individual seatwork, listening to lectures, or working at the chalkboard. Instead, teachers are learning how to use technology to stimulate problem solving, teamwork, collaboration, research, and inquiry. Students are encouraged to become more autonomous and assume responsibility for their own learning.

Administrative Support

Teachers do not make these tremendous changes, however, unless they are provided with administrative support. Houston's plan places heavy emphasis on training **all** school leaders. Less attention is given to making them proficient in **using** computers. Rather, they must understand the technology's potentials, implementation obstacles, and administrative policies and priorities. Ideally, they will avail themselves of the training that will allow them to become proficient users.

All principals and area superintendents in the district received 20 hours of training before any training was even initiated with teachers. School board members have been offered 40 hours of training, too. Six of nine board members have participated. Different types of training are offered by the Department of Technology, depending upon the circumstances associated with implementation.

Types of Training

- **Contingency**--If a teacher or team of teachers requests one or more computers, an implementation plan is sent to the Department of Technology. When approved, the training necessary to carry out the plan is provided as a "contingency" to providing the hardware and software. Only after staff receives the training can the

computers be installed or software be provided. Training is compulsory for instructors who teach the K-12 computer science curriculum.

- **Update**--All district computer specialists are expected to attend 30 hours of training on new hardware and software each year. This assures that staff will stay current.

- **Elective**--Every three months, the Department of Technology publishes a calendar of inservice workshops which are open to anyone in the district who would like to attend them. At least four workshops are offered each day on such diverse subjects as programming languages, word processing, computer scheduling, and software evaluation.

- **Teacher Technologists**--This is a formal training program composed of 296 hours of instruction. Modules cover all the topics with which a technology generalist would need to be familiar, including computer curriculum, strategic planning, software/ hardware evaluation, programming languages, computer maintenance, telecommunications, and operational concepts. The program is competency based, with examinations given at the end of each four-hour module. All computer proficiencies (e.g., word processing) must be demonstrated on the computer.

- **Administrative**--The Department of Technology develops systems solutions to problems facing the district. Periodic inservice sessions are scheduled for all school leaders (who are **required**

to attend) so they are better prepared to implement these solutions. For example, the Department of Technology developed several software packages and support materials which were presented to 230 principals in a nine-day inservice entitled "Using Technology to Manage Change." A trio of software packages was introduced at this inservice to teach the principals how to use district-developed software to manage activity funds, balance school budgets, and track student attendance.

Other Types of Technology Support

In attempting to standardize the quality of technology utilization through training, HISD hopes to avoid thwarting creativity. District-wide programs are designed and supported for "top-down" implementation, but schools have the freedom to complement them with their own "bottom-up" plans. Contingency and elective training sessions are offered to assist school staff in implementing their own ideas. These sessions have generated some clever ideas. One high school decided to offer its students a chance to become computer repair technicians, which is predicted to be the fastest growing career field in the U.S. for the near future. At another school, a teacher proposed using micros with highly specialized input devices to reach severely handicapped students. One of Houston's arts magnet schools decided to capitalize on the Apple Macintosh's graphics capabilities in order to interest young artists in computer assisted design.

A variety of services is offered to teachers and administrators to encourage them to make that all-important personal commitment to learning about technology:

- **E-Net**--This electronic communication network allows teachers and principals to communicate with each other and with the technical and curriculum experts who can answer their questions. The network is available 23 hours per day.

- **Software library**--A software library with over 4000 programs and 60 journals is available for preview .

- **Advisory list**--The Department of Technology staff coordinates software and curriculum review.

- **Newsletter**--A bi-monthly newsletter called the ***Technogram*** keeps district personnel up-to-date on new technology developments and recognizes outstanding programs and their staff.

- **Mentors**--Each teacher technologist is assigned to a Department of Technology staff member who serves as his/her mentor, providing advice and consultation.

- **Annual Technology Fair**--Teachers are encouraged to work on projects that will boost their own efficiency, improve school productivity, and help children learn how to use computers. An annual fair provides teachers and their students with recognition. These events are a favorite with television stations. Houston has been able to secure $6000 annually from a local corporation to be presented as awards at the fair. The funds are given to the three schools with the most number of contest winners, and are spent to purchase additional hardware or software.

- **Stipends**--Teachers who complete a certain number of hours of training each year are paid as much as $2,000 annually.

- **Parent Participation**--Teachers are provided with additional hardware and software if they can get parents at their school involved in using computers for home learning.

Ways to Deal with Limited Resources

Training has been a key ingredient in the success that Houston has had in integrating technology. This training is part of an overall support system designed not only to upgrade staff members but to nurture them. The many services provided by the Department of Technology are expensive because they are so labor intensive. Houston, like many other schools, has serious budget problems--the local tax base is shrinking, federal funds are on the decline, and Texas state mandates are requiring more local funds to implement. It has taken a tremendous amount of resourcefulness to find ways to supplement the Chapter I and II funds the district is already using for hardware and software.

Some of the most creative and effective ways of dealing with scarce resources include the development of:

- **Matching funds programs**--Schools are encouraged to hold their own fund-raisers. The district matches the school contribution for hardware and software.

- **Software licenses**--Site license contracts are entered into with major publishers which allow the district to duplicate software for a flat rate.

- **School partnerships**--Each school in the district has been paired with a local business which provides support for the school and its programs. Types of support include financial contributions, volunteers, and consultant advice.

- **Software development**--Several of Houston's staff members have developed programs that are used in the district and are marketed through commercial companies. The royalty income from software sales helps defray development costs.

- **Computer resource centers**--Placing computers and other technological equipment in one campus location helps defray the costs of electrical work, security devices, and supervisory personnel.

Conclusion

Few would disagree today that the United States' educational delivery system needs improvement. Many educators agree with Houston that technology holds the most promise for real, long-lasting change.

Consider why business and industry have adopted technology so thoroughly: it cuts costs and boosts productivity. The same benefits await education.

The purpose of this paper has been to explain how planning and training underlie the use of technology. Houston has taken a centralized approach to planning, yet has tried to promote campus-level autonomy as much as feasible. The alternative to planning may be seen in districts that have an unmanageable mix of hardware and software that no one can use, repair, or learn from.

Perhaps the five most important lessons that Houston has learned about technology implementation since 1982 are:

- Establish policies early.
- Standardize hardware and software.
- Train administrators first, teachers second.
- Use technology to teach technology.
- Emphasize practical computer applications.

The public wants the schools to improve, but is unwilling to pay for "more of the same." In the words of the Chinese proverb, taxpayers are tired of planting seeds for the short term; they want to educate for the next century. Computer technology offers educators the most exciting tools ever designed for learning. It is our job to use these tools to effect substantive, far-reaching change in education.

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